

Requirements Specification

Ambulance Dispatch System

Submitted to:

Dr. Chung

Submitted by:

Chris Rohleder, Jamie Smith, and
Jeff Dix

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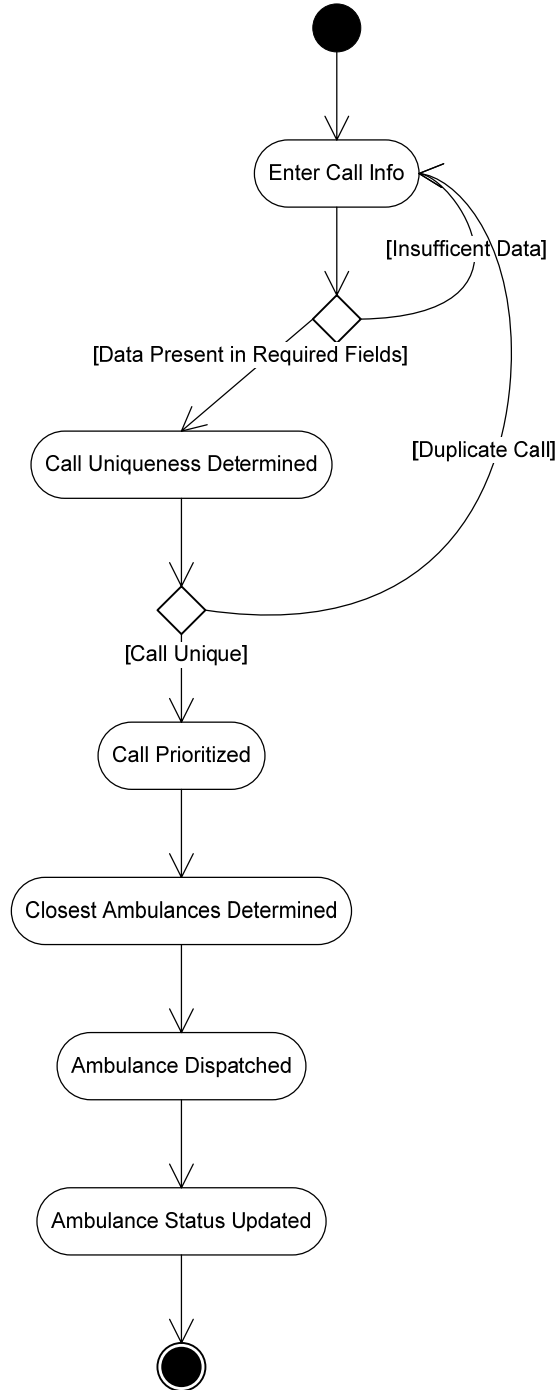
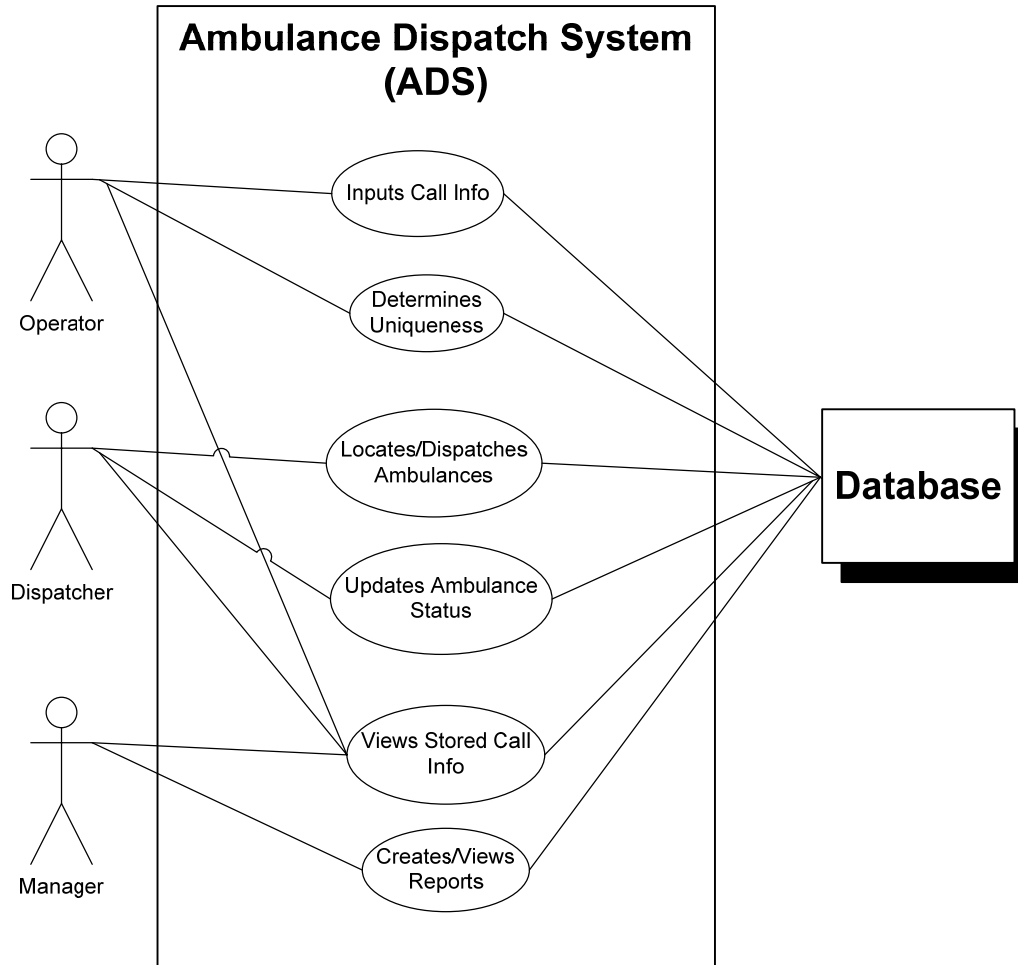


Figure 2: Use Case for Ambulance Dispatch System



1.0 INTRODUCTION

This section introduces the requirement specification document for the Ambulance Dispatch System. It provides the purpose and scope of the system. Any definitions and references are listed in this section as well as an overview of the remaining requirements specification document.

1.1 PURPOSE

This requirements specification document describes the functions and requirements specified for this Ambulance Dispatch System (ADS). This dispatch system is needed to help ensure that the ambulance dispatching company meets all federal mandates about the speed at which an ambulance is dispatched. In order to make this possible, the system greatly decreases the amount of paperwork that must be filed. This system shall also help the company ensure that they are providing an adequate amount of ambulances for each of their service areas by enabling the management to track the status of each ambulance and a log of ambulance activity.

1.2 SCOPE

The ADS shall assist the operators and dispatchers in quickly and efficiently dispatching ambulances to a 911-incident call. This system shall reduce the paperwork that is currently filed for each 911 call, which shall in turn help the company meet the federal mandates. This reduction of paperwork will allow the company to keep costs low. (These mandates state that an ambulance must be dispatched within an average of 3 minutes of a 911-incident call. The ambulance must arrive at the scene of the incident within an average of 11 minutes of its dispatch.) The ADS shall allow operators to input the 911 call information. The system shall assist the operator in determining the uniqueness of calls and assist the dispatcher in locating a nearby ambulance. The system prioritizes calls and allows the dispatcher to update the status of each ambulance. All 911 call information, ambulances dispatches, and ambulance status shall be logged and stored in a central computer database.

The ADS shall not replace the way in which dispatchers contact ambulances and ambulances contact dispatchers, through hand-held radios. The system shall not take into account congested roads and areas of high traffic. The dispatchers should be aware of traffic conditions when an ambulance is dispatched. An interface among ambulances and hospitals shall not be implemented in this system. Regarding hospitals, ambulances should continue the way in which they currently operate. The system shall not determine if a 911-incident call is a duplicate of a currently pending claim; however, the system shall provide an interface to assist the operator in making this decision. The system shall not decide what ambulance to dispatch; this remains the dispatchers' decision.

1.3 DEFINITIONS, ACRONYMS, AND ABBREVIATIONS

ADS – Ambulance Dispatch System

C#.NET – A computer language designed for the Microsoft .NET framework used for creating Microsoft Windows applications.

Dispatcher – The persons who decide what ambulance to dispatch. The dispatcher also contacts the ambulance drivers as well as updates the status of each ambulance.

Gigabyte – A unit of computer memory or data storage equal to 1,024 megabytes or one billion bytes.

Megabyte – A unit of computer memory or data storage equal to 1,048,576 bytes or one million bytes.

Microsoft .NET Framework – Microsoft's application development platform that allows developers to create Microsoft Windows applications.

Linux – A Unix-like computer operating system.

Operator – The persons who receive the 911-incident calls and input the call information into the system.

The operator also determines the uniqueness of each call.

UNIX – A multi-user, general purpose computer operating system.

Windows 2000, XP – Microsoft’s proprietary computer operating system.

1.4 REFERENCES

Lawrence Chung “Software Engineering”

Manager Sam

Operator/Dispatcher Sam

Ambulance Sam

Requirements Specification Template

1.5 OVERVIEW

This document provides a high-level description of the Ambulance Dispatch System. It identifies the involved users and helps to explain their roles. The document then describes general software and hardware constraints as well as any assumptions and dependencies concerning the system. The majority of this document focuses on the specific requirements list. A master list of specific requirements is given first, followed by each requirement explained in detail in the next section. The external interfaces are addressed in the subsequent section. External interface requirements are requirements involving user hardware, software, and communications interfaces. This requirements document concludes with general design constraints specified by the customer along with the business requirements this software must meet.

2.0 GENERAL DESCRIPTION

This section is used to provide a high-level description of the system, as well as identify the users involved and help explain their roles.

2.1 SYSTEM FUNCTIONS

The ambulance dispatch system shall help ensure ambulances are dispatched quickly and efficiently in order to reduce costs for the ambulance providers and increase their ability to save more lives. To facilitate these needs, the system shall allow operators to input information pertaining to a particular incident. Based upon the severity of the incident, the system shall prioritize each call to ensure ambulances are dispatched, first to the people who need the most help. The system shall also use the information provided to help the operators determine the uniqueness of a call. The system shall keep track of all ambulances; this shall allow the dispatchers to select the nearest or most available ambulance to send to an incident. The dispatcher can update the ambulance's progress allowing the management to know how quickly their ambulances are responding to an incident. This can be used to make sure the ambulance providers are meeting all federal mandates and are providing the right amount of services for their area.

2.2 USER CHARACTERISTICS

There are three main groups of users which will use the system. The first group of users is the System Administrators. The System Administrators are concerned with data integrity and system stability. This group has the highest computer skill set and is capable of supporting a computer network. Their interaction with the system is very limited and is only necessary for backing up and archiving data from the database or to provide basic computer support to the other users of the system.

The management team makes up the second group. They interact with the system to view reports and statistics about the quality of service their employees are providing. They have basic computer experience and are familiar with word processors, e-mail clients and other management reporting systems. They spend most of their time ensuring that incoming calls are answered quickly and that ambulances are allocated efficiently.

The final group is the operators and dispatchers. They are proficient in typing and have intermediate computer knowledge. They are used to working quickly and efficiently and are capable of working under high-pressure situations. They are the only group which deals directly with customers over the phone on a daily basis. This group communicates with the customers to determine the type of assistance the customer requires, and then they deploy an ambulance if this service is necessary.

3.0 GENERAL CONSTRAINTS

Software limitations –

- System shall need Windows 2000 or greater with at least the Microsoft .NET Framework 1.1 installed.
- Visual Studio 2005 with C#.NET shall be used in the development of the ADS.

Hardware limitations –

- Each operator/dispatcher shall need a PC capable of running Microsoft Windows 2000 or greater, with at least the Microsoft .NET Framework 1.1 installed.
- The database shall be stored on a Windows, Linux, or UNIX server using Apache and MySQL, and all computers shall need to be networked together so that all can have access to the database.

4.0 ASSUMPTIONS AND DEPENDENCIES

The system assumes that the users have adequate skill with using computers and computer software.

It is assumed that the customers have a sufficient number of computers in quantity, at least one per operator/dispatcher.

The system is dependent on the Microsoft .NET Framework to operate.

5.0 REQUIREMENTS MASTER LIST

This section contains the listing of all requirements for the Ambulance Dispatch System. The list contains unique requirement numbers and names with a short description of each requirement. The following section describes these requirements in full detail.

- REQ 1:** Operator Input – The system shall allow the operator to input information relevant to a 911-incident call.
- REQ 2:** Uniqueness of Call – The system shall help determine the uniqueness of each 911-incident call.
- REQ 3:** Prioritize Call – The system shall prioritize the 911-incident call.
- REQ 4:** Locate Available Ambulances – The system shall find the nearest three Ambulances.
- REQ 5:** Ambulance Status Update – The system shall allow the dispatcher to update the status of each ambulance in the database.
- REQ 6:** Ambulance Actual Time Update - The system shall calculate the actual time it took the ambulance to arrive to the scene and to the hospital.
- REQ 7:** Information Storage – A database shall store all information to ensure quick access and security.
- REQ 8:** Management Report – The systems shall provide a mechanism for displaying results and statistics regarding the ambulance’s service.
- REQ 9:** Information Retrieval – Users shall have the ability to access information regarding pervious calls.

6.0 REQUIREMENTS DETAIL

6.1 REQ 1: OPERATOR INPUT

6.1.1 DESCRIPTION

The system shall allow the operator who receives an incoming 911 call to input information, which is the beginning process of dispatching an ambulance.

6.1.2 INPUT

The operator shall input the necessary information in the tab labeled “Log Calls” in the system’s user interface. The system shall have nine types of data in which the operator must input to begin the ambulance dispatch process.

The first fields are designated the “Name of Caller.” There shall be separate text fields for the first name, last name, and middle initial of the caller. A string of characters shall be the type of data that is input in these fields. This shall not be a required field.

The “Contact Phone Number” of the caller shall be the second type of information that the operator must input. This phone number must be in the format ###-###-####, where # is a number from 0 to 9, and shall be input in a text field. This shall be a required field for the ambulance dispatch process.

The “Location of Incident” is a required field that must be input by the operator. In this text field, the operator will input the address of the incident. If the exact address is not known, the operator will input an approximate address of where the incident is located. (In the “Other Relevant Information” text field at the bottom of the screen, the operator may input a more descriptive explanation of where the incident has occurred.)

The “Type of Incident” is the fourth set of fields in which the operator shall input information. Two fields exist under “Type of Incident.” The first is a drop down box where the operator shall select one from many general incident descriptions (i.e.: car accident, domestic violence). The second field is a text field where the operator shall input a more descriptive explanation of the specific event. These two fields under “Type of Incident” are required fields.

The “Priority” field is a required field where the operator shall select a priority number that corresponds to the severity of the incident. This field consists of a drop down box. The operator must select one priority number ranging from 1 to 5 where 1 is the least urgent and 5 is the most urgent type of incident.

The “Number of Patients” field is a required field where the operator shall input the number or approximate number of patients that are involved in the incident. This field shall consist of one text box and shall only accept an integer number (0, 1, 2, 3, 4, 5...). This field is important because an ambulance can only hold two patients at one time.

The “Name of Patient(s)” text field is where the operator will input the name(s) of the persons involved in the incident. This field shall only consist of one text field; the operator separates the individual name with commas or semicolons. This is not a required field for an ambulance to be dispatched.

The final field for operator input is the “Other Relevant Information” field. This field shall simply consist of one text field where the operator can input any other important or relevant information that pertains to this incident and the ambulance driver(s) who are dispatched. This is not a required field.

A button for processing the information shall be located near the bottom of the screen. The operator shall press this button once s/he has entered the necessary information.

6.1.3 DISPLAY

The nine types of operator input fields shall be positioned in the center of the “Log Calls” tab screen. Each type of field will be placed one right below the other. The “Process Claim” button shall be located near the bottom of the screen, under all of the input fields.

6.1.4 SYSTEM PROCESSING

The system is essentially idle while the operator is inputting the information that relates to an incident. Once the operator clicks the “Process Claim” button, the system determines if the operator has input the correct type of information. If the operator has not input the correct information as defined by the input section of this requirement description, the system shall alert the operator. The system shall display which information must be corrected, and the operator shall be able to correct the input data. Once the information is accepted by the system, the information is encrypted and sent over the TCP/IP network to the server. This server places the data into its proper table in the database. The system shall then proceed to the next part of the dispatch process: prioritizing the calls, determine the uniqueness of the calls, and locating the nearest three ambulances. These processes are described in the subsequent requirement descriptions.

6.1.5 SYSTEM OUTPUT

The system shall display an error message if any of the information that the operator has entered is incorrect as defined by the input section of this requirement description. In the “Log Calls” tab where the operator inputs the information, the system shall alert the operator of incorrect information by displaying a red arrow by the type of information that is incorrect. The text color of the type of information that is incorrect shall also change to red from black.

Once the operator has clicked the “Process Claim” button and the information entered is correct, the system shall advance to a screen to allow the operator to continue or cease the dispatch process based on whether the call is unique. This screen and process is described in “REQ 2: Uniqueness of Call.” (The advancement to this screen will also let the operator know that the system accept the input information.) All information the operator inputs shall be stored in the database on the server.

6.1.6 OTHER

N/A

6.1.7 CONSTRAINTS

The speed at which calls are inputted and logged depends on the operator’s typing speed as well as the state of mind of the caller and how quickly the operator is able to question the caller. The quickness of the processing of claims also depends on the amount of traffic the network and server are experiencing.

6.1.8 DATA HANDLING

The database in Requirement 7 is required to store the operator input.

6.2 REQ 2: UNIQUENESS OF CALL

6.2.1 DESCRIPTION

The system shall help determine the uniqueness of each 911-incident call. This process shall occur after the operator has clicked the “Process Claim” button. The system shall display incidents that are similar to the current call, and the operator shall make the final decision whether to continue dispatching an ambulance for this incident.

6.2.2 INPUT

The operator has already input information about each incident in the system’s user interface. This information is then stored into a designated table in the database.

For this process, the operator shall be able to choose if s/he believes that this call is a duplicate call of an incident that is already pending. If the operator believes this is a duplicate event, s/he shall select the event for which this is a duplicate call. The operator shall then click the “Duplicate Call” button. A confirmation message shall appear, and the operator shall confirm, or cancel, if this is a duplicate call.

In the event that the operator believes that this call is unique, s/he shall click on the “Continue” button. The screen will advance to the dispatchers’ screen. (This screen is described in Section 7.0 of this document.)

6.2.3 DISPLAY

During this process, the system shall display a list of incidents, which are currently pending and match 3 of the 5 required inputs of the current call. This list will occupy the majority of this screen and will be displayed in a list where the operator can select the event. The operator shall select a certain event if s/he believes that the current call is a duplicate call for this already pending event.

Two buttons will be located near the bottom of the screen under the list of currently pending, matching events. The first button will be titled “Duplicate Call” which the operator can click if s/he believes the current call is a duplicate call of an already pending event. If this button is pressed, a message box shall appear asking the operator to confirm that this is a duplicate call. The operator can click “Confirm” or “Cancel” in this message box. If “Confirm” is clicked, the screen shall return to the “Log Calls” tab. However, if “Cancel” is clicked, the operator shall return to the current screen to determine if the current call is unique.

The second button on the Uniqueness Call screen is titled “Continue.” If this button is clicked, the screen will advance to the dispatchers’ screen. (This screen is described in Section 7.0 of this document.)

6.2.4 SYSTEM PROCESSING

Once the operator has input information about each incident in the system’s user interface, this information is then stored into a designated table in the database. The system shall then query the database and populate a list of currently pending incidents that match 3 of the 5 required inputs of the current call.

If the operator determines the current call, to be a duplicate call, the system shall log, in the database, the incidents that are determined to be duplicates. Otherwise, the system shall advance to the dispatchers’ screen. (This screen is described in Section 7.0 of this document.)

6.2.5 SYSTEM OUTPUT

The system shall output a populated list of the currently pending incidents that match 3 of the 5 required inputs of the current call. If the “Duplicate Call” button is pressed, the system shall output a confirmation message box to which the operator shall respond. The system shall log, in the database, the incidents that are determined to be duplicate.

6.2.6 OTHER

N/A

6.2.7 CONSTRAINTS

The operator must rely on his/her expertise, as well as the information in the currently pending incident, to determine whether an incident is unique. The operator might also be able to ask questions to the caller to help clarify if this call is a duplicate and if an ambulance is currently being dispatched to this incident. If the operator is still unsure whether this is a duplicate call, it is safer to continue with the dispatch process.

6.2.8 DATA HANDLING

The database in Requirement 7 is required to store and access the information pertaining to each 911-incident call.

6.3 REQ 3: PRIORITIZE CALL

6.3.1 DESCRIPTION

The system shall prioritize the 911-incident call based on its priority.

6.3.2 INPUT

The input necessary is the priority of the call. This can be found in the database.

6.3.3 SYSTEM PROCESSING

Each 911-incident call shall be placed in a priority queue based on the incident's priority. The calls that are most urgent, those with the highest priority, will be acted on first.

6.3.4 SYSTEM OUTPUT

The priority queue shall be stored in the database. Each time an element is added, removed, or changed in a queue, the queue shall be updated in the database.

6.3.5 OTHER

N/A

6.3.6 CONSTRAINTS

N/A

6.3.7 DATA HANDLING

The database in Requirement 7 is required to store and access the information pertaining to each call incident.

6.4 REQ 4: LOCATE AVAILABLE AMBULANCES

6.4.1 DESCRIPTION

The system shall find the nearest ambulances and the dispatcher shall choose the number needed to dispatch. For each set of 2 patients at an incident, 3 available ambulances will be shown (if there is only one patient, 3 ambulances will be shown as well). The dispatcher can then select the appropriate number of ambulances to dispatch to the incident. (Each ambulance can carry two patients.)

6.4.2 INPUT

The approximate amount of time for each ambulance to become available is the necessary input. This can be retrieved from the database. Also, there shall be a button for each ambulance listed so the user can select the ambulance to associate with this incident. The user can then input the approximate time for each ambulance to arrive at the scene, and from the scene to the hospital.

6.4.3 DISPLAY

The appropriate number of ambulances shall be outputted along with a checkbox for each so the dispatcher can select the ambulances s/he will dispatch. A new window is then brought up where the dispatcher can input the approximate time it will take each ambulance to arrive at the scene and the approximate time it will take the ambulance to get from the scene to the hospital.

6.4.4 SYSTEM PROCESSING

The system shall locate the appropriate number of ambulances that have the least amount of time before they complete their current job. Once an ambulance(s) has been selected, the dispatcher must input the estimated time for the ambulance to arrive at the scene and the estimated time from the scene to the hospital. This information shall be entered into two text boxes.

6.4.5 SYSTEM OUTPUT

The ambulances with the least amount of time before they are ready to be dispatched shall be displayed, along with the time until they are free.

6.4.6 OTHER

N/A

6.4.7 CONSTRAINTS

The number of ambulances the system shall display cannot exceed the total number of operational ambulances.

6.4.8 DATA HANDLING

The database in Requirement 7 is required to access information about the status of each ambulance in order to decide which ambulances will be ready the quickest, and to store the new status of the selected ambulance.

6.5 REQ 5: AMBULANCE STATUS UPDATE

6.5.1 DESCRIPTION

The dispatcher shall be able to update the status of the ambulances.

6.5.2 INPUT

There shall be two buttons, one to be pressed once the ambulance reaches the scene and the other once the ambulance has reached the hospital.

6.5.3 DISPLAY

All currently pending incidents and ambulances will be displayed on the left side of the screen in a list. The system shall allow the dispatcher to choose which ambulance to update. Once an ambulance is chosen, the system will display two buttons. The dispatcher will press one of the buttons when the ambulance reaches the scene of the incident. S/he will press the second button once the ambulance reaches the hospital. Both of these buttons update the status of the ambulance.

6.5.4 SYSTEM PROCESSING

When either of the status update buttons is pressed, the system calculates the actual time. This is described in more detail in Requirement 6.

6.5.5 SYSTEM OUTPUT

The output of the ambulance status update is the actual time recorded by the system for each ambulance phase (from dispatch to the incident and from the incident to the hospital). The actual time the system records is described in more detail in Requirement 6.

6.5.6 OTHER

N/A

6.5.7 CONSTRAINTS

N/A

6.5.8 DATA HANDLING

The database in Requirement 7 is required to store the status updates of each ambulance.

6.6 REQ 6: AMBULANCE ACTUAL TIME UPDATE

6.6.1 DESCRIPTION

The system shall log the actual time it took for the ambulance to reach the scene, as well as how long for it to reach the hospital.

6.6.2 INPUT

Refer to Requirement 5.

6.6.3 SYSTEM PROCESSING

When the system updates the status of an ambulance, as stated in Requirement 5, it calculates the actual time it took for that phase of the process. This is accomplished by subtracting the current time from the time the ambulance was dispatched.

6.6.4 SYSTEM OUTPUT

The system shall store the actual time calculated in the database for logging purposes so that it can be determined whether the federal mandates are being met.

6.6.5 OTHER

N/A

6.6.6 CONSTRAINTS

The dispatcher will have to notify the system when the ambulance has finished its task. Communication from the ambulance to the dispatchers is not automated.

6.6.7 DATA HANDLING

The database in Requirement 7 is required to store the actual time of each phase of the ambulance process.

6.7 REQ 7: INFORMATION STORAGE

6.7.1 DESCRIPTION

The system shall provide a MySQL database to allow for quick accessing of information and to ensure the information is protected.

6.7.2 INPUT

The operator shall input information about each incident into the system's user interface. This information is then stored into a designated table in the database.

6.7.3 DISPLAY

The system's user interface shall display information from the database. The operators and managers shall have the ability to retrieve information from the database.

6.7.4 SYSTEM PROCESSING

Once the operator clicks the "Process Claim" button after they have logged all the relevant information from the caller, the information is encrypted and sent over the TCP/IP network to a server. This server places the data into its proper table in the database. The users can also request certain information from the database, and the database shall process the request and return the relevant information to the user's computer. The user's computer then processes this information and displays it in the user interface.

6.7.5 SYSTEM OUTPUT

The database shall record all system events to log files on the server. System events include errors, data access times, and backup times. This output shall be accessible to the system administrators so they can determine if the database is functioning correctly.

6.7.6 OTHER

The database requires a Linux, UNIX or Windows environment with at least 100 Gigabytes of free hard-drive space, 1 Gigabyte of RAM and MySQL properly installed and configured.

6.7.7 CONSTRAINTS

The amount of traffic the database can handle is determined by the speed of the server or the speed of the network. A dedicated server or multiple servers are necessary if the number of calls the operators receive on average is very large.

6.7.8 DATA HANDLING

All data is handled through a database as described above.

6.8 REQ 8: MANAGEMENT REPORTS

6.8.1 DESCRIPTION

The system shall provide a user interface to allow the managers to view how long it takes an ambulance to respond to an incident after it has been logged by the operators.

6.8.2 INPUT

The managers can view response times and statistics for a particular date or a particular ambulance either by selecting a daily, weekly, monthly, yearly or by ambulance view. This information is selected from a dropdown box. Once a view is selected, the manager must click the “View Report” button to see the information.

6.8.3 DISPLAY

The user interface shall have a dropdown box and button on the top left hand side of the display. Once the user clicks the button, the information requested is populated in the center of the screen. If no information is returned from the database, the following message shall be displayed: “No information found.”

6.8.4 SYSTEM PROCESSING

Once the desired view is selected from the dropdown box and the “View Report” button is pressed, the user’s computer shall query the database for the desired information. If the database returns data, this data is processed and displayed in a readable form, or else an appropriate error message is generated informing the user why the data is not available.

6.8.5 SYSTEM OUTPUT

All output is sent to the system’s user interface. The management reports are accessible via a tab marked “Management Reports”, which is found at the top of the main user interface.

6.8.6 OTHER

N/A

6.8.7 CONSTRAINTS

If the number of ambulances and incidents is very large during a certain time, some of the views such as yearly could return more data than the computer can process in memory. In this case, an error message is generated. The only remedy for this is to place more memory in the computer or to narrow the view to something which would return less data.

6.8.8 DATA HANDLING

The database in Section 7 is required for the management reports.

6.9 REQ 9: INFORMATION RETRIEVAL

6.9.1 DESCRIPTION

The system shall provide an interface for viewing the information about all previous calls for 2 years.

6.9.2 INPUT

The user can search the system for incidents by inputting the caller's telephone number, the caller's name, the caller's address, or the date of the call.

6.9.3 DISPLAY

The user shall see four text fields and a "Search" button on the upper left hand side of the system's user interface. Each text field shall have a description of the type of filter (i.e.: address or name) to the left of the text field. The information the user requests is displayed in the center of the user interface sorted by timestamp.

6.9.4 SYSTEM PROCESSING

Once the user clicks search, the computer queries the database using the text from the fields to narrow down the results. If all text fields are empty, the system shall return every call which has been logged in the database. The relevant information is returned to the requesting computer which processes the data and displays the information.

6.9.5 SYSTEM OUTPUT

All output is directed to the system's user interface and is displayed under a tab marked "View Calls." If no information is found, the system shall generate an error message telling the user what to do.

6.9.6 OTHER

N/A

6.9.7 CONSTRAINTS

The amount of information the interface can display to the user is determined by their computer's memory. To view large amount of data, the user might need to increase the computer's memory or view smaller amounts of information.

6.9.8 DATA HANDLING

The database in Section 7 is required to use the View Calls feature.

7.0 EXTERNAL INTERFACE REQUIREMENTS

This section shall describe the interface requirements for the ambulance dispatch system. They specify the way the user shall interact with the system as well as define the necessary hardware interfaces and communication interfaces required by the software to store and retrieve data.

7.1 USER INTERFACES

The user interface shall follow basic Windows style and functionality conventions. The interface has three tabs at the top left-hand side of the screen, which will allow users to easily switch between the different parts of the program. The first tab, named “Log Calls”, shall have all the fields necessary for an operator to input information about a new incident or call. Once the information is logged and the submit button is pressed, the screen is changed to the dispatcher’s view. In this screen, the dispatcher can see the three closest ambulances to the incident. Once an ambulance is selected, the dispatcher is taken to another screen which has two text fields and two buttons. The first text field is to enter the estimated time it should take for the ambulance to get to the incident and the second field is the estimated time required to get from the incident to the hospital. The buttons represent the actual time taken for these events. After one of the tasks has been completed, the user clicks the button, and the system calculates the actual time.

The second tab allows operators and dispatchers to view information about previous calls. This interface uses text boxes to allow the user to search for specific strings. The third tab allows managers to view statistical information about the calls which are made over a certain period of time. This interface has dropdown boxes which the user can use to refine their search.

7.2 HARDWARE INTERFACES

The application can run on any hardware which supports Windows 2000 or Windows XP. The system must have at least 100 Megabytes of free disk space to install the program and 512MB-1GB of memory is required to load the application. The program does not write information directly to the user’s computer, but instead uses a database which is located on a network server. The user’s computer transfers and receives data from the server using basic networking protocols. All systems’ information is stored in the server’s database which stores the data on the server’s disk.

7.3 SOFTWARE INTERFACES

The system requires a properly configured version of Windows 2000 or Windows XP to run the application. These computers must have Microsoft .NET Framework 1.1 or greater installed. The system’s server can use either Windows, Linux or UNIX, but it must have MySQL properly installed and configured.

7.4 COMMUNICATIONS INTERFACES

All data transferred between the server and the individual computers shall use the TCP/IP networking protocol over an Ethernet connection. This network is closed and is not accessible from the internet. This ensures unauthorized access is prohibited.

8.0 GENERAL DESIGN CONSTRAINTS

The customer requested a system where an operator can input information about a 911-incident call. The system then must prioritize calls and allocate and mobilize a suitable ambulance(s) to comply with federal mandates. These mandates state that an ambulance must be dispatched within an average of 3 minutes of the 911-incident call. The ambulance must arrive at the scene of the incident within an average of 11 minutes from its dispatch. (The average times are calculated for the fiscal year.) At the time of the 911 call, once the input information has been gathered, the customer requests that the system be able to locate the three nearest ambulances to the incident. Dispatchers must be able to update the status of each ambulance. Each status change, along with each of the 911 call's information, must be stored to allow reports to be generated. These reports can verify the company's compliance with current federal mandates. The customer also wishes to replace operators as much as possible in an effort to reduce costs.